

	Maria Carolina Machado da Silva, PhD Department of Morphology, Institute of Biological Sciences, Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil
Maria Carolina Machado da Silva is a biomedical scientist and postdoctoral researcher at the Department of Morphology, Institute of Biological Sciences, Federal University of Minas Gerais (UFMG), Brazil. She holds a PhD (2023) and MSc (2019) in Physiology and Pharmacology from UFMG and a degree in Biomedicine with a specialization in Clinical Analysis from Universidade FUMEC (2016). Her doctoral work focused on neuroimmune mechanisms involved in substance use disorders, particularly investigating how immune signaling pathways influence behavioral and neurobiological responses to cocaine exposure. She conducted part of her research as a visiting PhD student at the McKnight Brain Institute at the University of Florida (2022–2023), studying methamphetamine use. Her research integrated behavioral neuroscience with molecular, biochemical, and histological approaches to better understand the interaction between the immune system and neural circuits. Currently, she is a postdoctoral researcher in the Gene Therapy in Neurodegeneration Research Group at UFMG, where she works on the development of gene therapy strategies targeting neurodegenerative diseases. Her research focuses on the production and application of recombinant adeno-associated viral (rAAV) vectors to deliver proneural transcription factors, such as Neurogenin-2 (Ngn2) and Fezf2, as well as mRNA-based approaches aimed at promoting neuronal reprogramming and	

neuroregeneration in the central nervous system.

Her research integrates molecular biology, viral vector engineering, cell culture, and advanced imaging techniques, including immunofluorescence and confocal microscopy, to investigate neuronal degeneration, axonal regeneration, synaptic plasticity, and glial responses. In addition to her primary research focus, she collaborates on projects investigating the neurobiological and neuroimmune mechanisms involved in several neurological and neuropsychiatric conditions, including Alzheimer's disease, Parkinson's disease, epilepsy, depression, and central nervous system infections such as toxoplasmosis.

Through these interdisciplinary collaborations, her work contributes to a broader understanding of how immune and molecular mechanisms influence brain function across different pathological contexts. Her research interests lie at the intersection of neuroscience, immunology, and gene therapy, with the goal of developing innovative therapeutic strategies for neurological and neurodegenerative disorders.